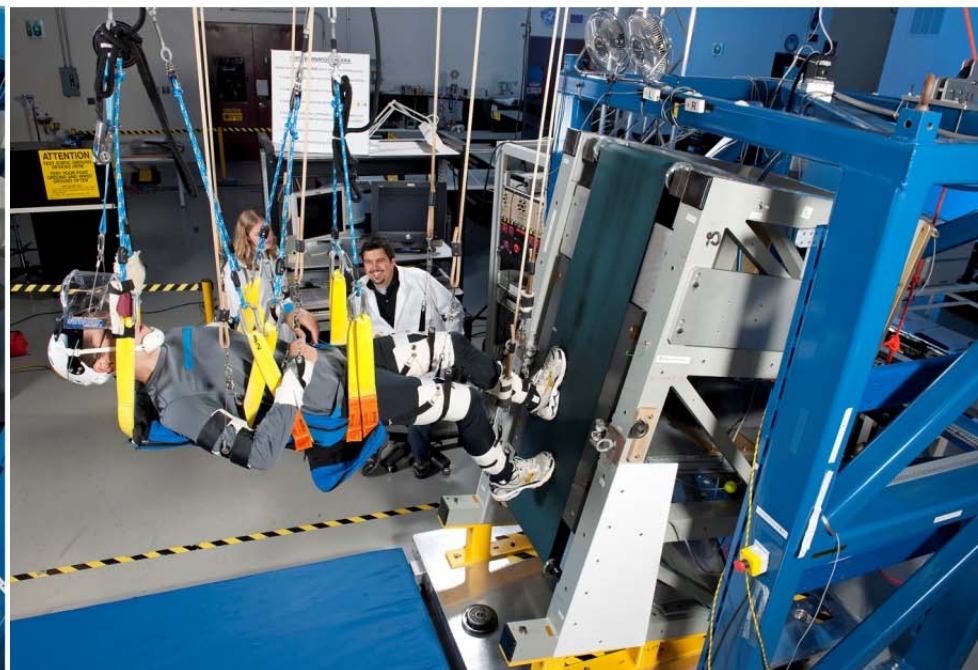
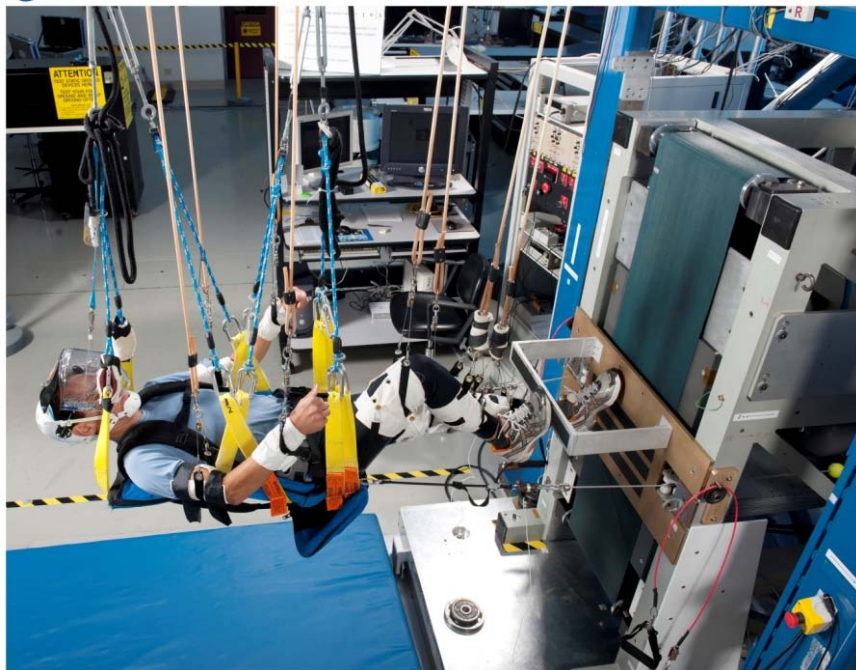


Simulating Space Exercise on Earth

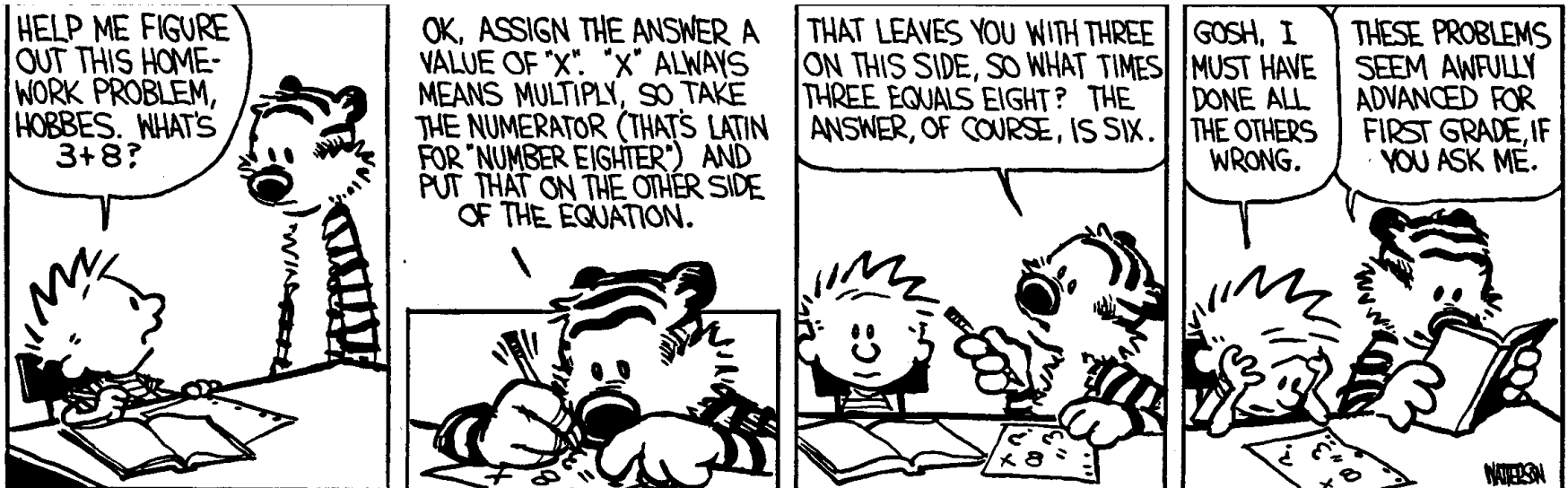


Kelly M. Gilkey
NASA Glenn Research Center

March 15, 2012 Avon Schools Science Night
Grades 3-6

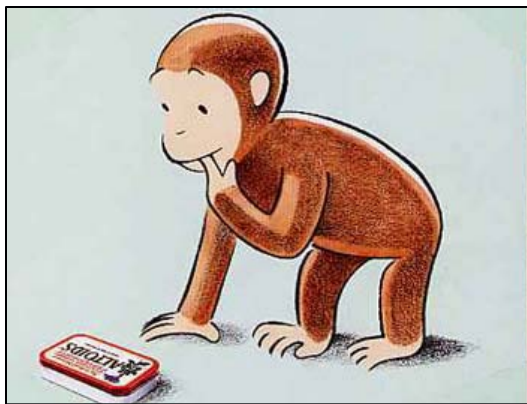
What is an Engineer?

- Engineers design and build structures and devices
- Engineering: the application of science and mathematics by which the properties of matter and the sources of energy in nature are made useful to people
- College: 4 year degree (Bachelor's)
- Mechanical, Civil, Electrical, Chemical, Biomedical



Characteristics of an Engineer

- Creative
- Organized
- Persistent
- Curious
- Do research
- Ask questions
- Interest in science and/or math





**International Space
Station**







Current ISS Exercise Equipment

Astronauts exercise 1-2 hours a day...



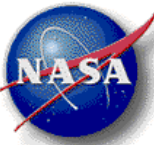
Cycle Ergometer



Treadmill



Resistive Exercise Device



How do we simulate zero-g exercise on Earth?



1 g

Zero-gravity Locomotion Simulator

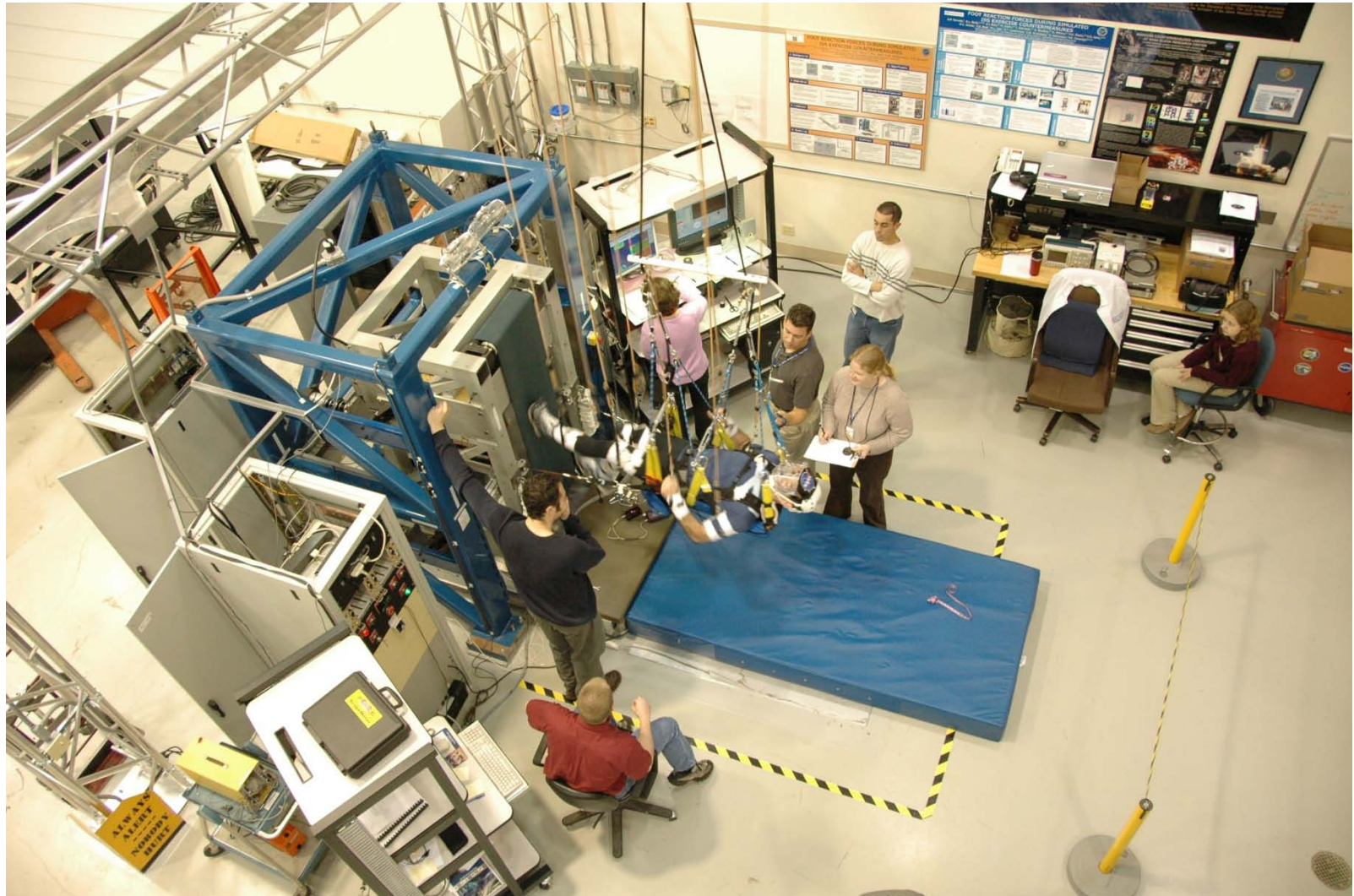
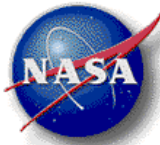


C-2007-1625



National Aeronautics and Space Administration
John H. Glenn Research Center at Lewis Field

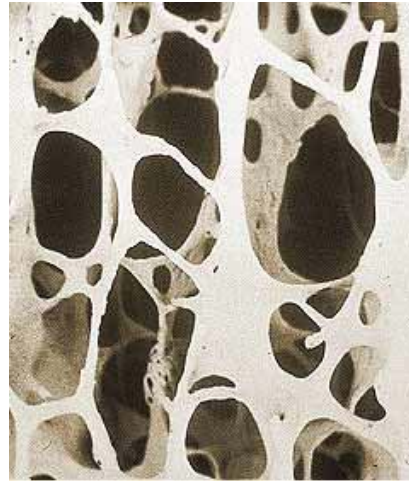
Exercise Countermeasures Lab



Effects of Microgravity on Bone

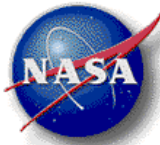
On-orbit – the skeleton is *unloaded*

- decrease in weight - bearing activity
- decrease in muscle strength and volume
- decrease in bone density
- changes in bone architecture



Final Shuttle Launch – Atlantis

July 8, 2011



Apollo 11 Moon Landing

July 20, 1969

